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Post Graduate Certificate in Antarctic Studies: ANTA 602

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## **Antarctic Future – Education**

**Learning about Antarctica in the 21<sup>st</sup> Century.  
A review of selected education resources  
available to primary teachers.**

**Abstract**

*Antarctica is a fascinating and beautiful place. It is the world's last great wilderness and has a profound effect on the world's climate and oceans systems. It is a place steeped in human history and interaction. Antarctica provides a platform for teachers to make relevant connections to what is happening to the world around us. This can be related back to the communities the students live in, fostering a set of values that can prepare and empower students as the decision makers of the future. This set of values can be developed using the New Zealand Curriculum key competencies. These key competencies are the basis for critiquing four Antarctic resources to see if they achieve the New Zealand Curriculum's vision for young people who are confident, connected, actively involved life long learners.*

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## Introduction

Learning becomes important for students when they are able to relate content taught to their daily lives (Irwin, 2009). While the Antarctic continent is not an immediately obvious topic to choose in light of this statement, it has the potential to spark an array of learning that can foster awareness of the world around students and potentially drive local action in the form of sustainability, citizenship, enterprise and globalisation. This will benefit wider parts of the world, including Antarctica, for the future. To make this learning relevant, teachers require material and resources that are dynamic, informative and provide for a variety of different learning styles. This review will critique four Antarctic teaching resources and their ability to achieve *The New Zealand Curriculum* vision for young people who will be confident, connected, actively involved life long learners. It will critically analyse the Antarctic resources by using the five key competencies; thinking, using language, symbols and text, managing self, relating to others and participating and contributing (Ministry of Education, 2007).

## Brief description of documents and resources

Two documents will be used as a basis for critically examining the Antarctic teaching resources. These documents are *The New Zealand Curriculum* (Ministry of Education, 2007) and the *Guidelines for Environmental Education in New Zealand Schools* (Ministry of Education, 1999).



Figure 1: A schematic view of *The New Zealand Curriculum* document.

*The New Zealand Curriculum* is a statement of official policy relating to teaching and learning in English - medium schools. It applies to all students ranging from Year 0 to Year 8, irrespective of their gender, sexuality, ethnicity, belief, ability or disability, social or cultural background or geographical location. Its principle function is to set a direction and guide schools in the design of their own culture and curriculum.

The key competencies, from *The New Zealand Curriculum*, used to critique the Antarctica Resources, are complex tools used by people to live, learn, work and contribute as active members of their communities. More complex than skills, the competencies draw also on knowledge, attitudes, and values in ways that lead to action. They are not separate or stand alone. They are the key to learning in every learning area (Ministry of Education, 2007).

The *New Zealand Curriculum* (2007) identifies five key competencies:

- thinking;
- using language, symbols and texts
- managing self;
- relating to others;
- participating and contributing.

Linked to the curriculum are the *Guidelines for Environmental Education in New Zealand Schools*. This is a document developed as a result of international concern about sustainability reflected in the Resource Management Act 1991 (Ministry of Education, 1999). The aim of Environmental Education is “a multi-disciplinary approach to learning that develops the knowledge, awareness, attitudes, values and skills that will enable individuals and the community to contribute towards maintaining and improving the quality of the environment” (Ministry for the Environment, 1998, p.9).

All four Antarctic resources acknowledge Antarctica is a special place and environment, which provides important knowledge and understanding of the world we live in. Their objectives are to:

Gill, M. (2008). *Care for our Coast Antarctica Teachers' Resource*. Auckland, New Zealand: Sir Peter Blake Trust.

- inspire environmental leadership in our young people, keeping the spirit of Sir Peter Blake alive;
- promote changes in behaviour through education and action, to ensure a more sustainable world;
- encourage schools and communities to show social responsibility for their local environment.

Haywood, E. (2002). *Classroom Antarctica*. Australian Antarctic Division.

Retrieved from <http://www.classroom.antarctica.gov.au/>

- enhance writing, literature, art, team building and creative thinking skills;
- pursue the study of significant environmental and social issues from a global perspective;

- promote an appreciation of the important role of Australians in Antarctica;
- encourage students to think critically about the key issues currently facing Antarctica.

Loves, J., & Champion, J. (1998). *Discovering Antarctica. A Resource Book for Teachers*. South Yarra, Australia: MacMillan Education Australia PTY LTD.

- develop skills in reading for factual and instructional text;
- provide activities that will help demonstrate students understanding of mapping, graphing, surveying, debating and other valuable skill areas;
- investigate the wonders of Antarctica using additional print and electronic media.

Naumann, R. (2007). *The Big Resource Book of Antarctica*. Hong Kong, China: Nelson Price Milburn Ltd.

- gain new knowledge and skills, especially in literacy;
- seek, use and create knowledge;
- become informed decision makers;
- practise all the processes of social enquiry;
- develop the key competencies

### Critical examination

The following section critically examines the four resources under review, in light of the key competencies from *The New Zealand Curriculum*.

Gill, M. (2008). *Care for our Coast Antarctica Teachers' Resource*. Auckland, New Zealand: Sir Peter Blake Trust.

The *Care for our Coast Antarctic* (2008) resource encompasses the vision of Sir Peter Blake and reflects his values throughout the resource. "We want to restart people caring for the environment as it must be cared for and we want to do this through adventure, through participation, through education and through enjoyment" (Gill, 2008, p.2).

The *Care for our Coast Antarctica* (2008) resource bases itself on the inquiry learning approach, which involves students' self initiated action on tasks related to the context. Inquiry - based learning is a constructivist approach, in which students have ownership of their learning. It starts with exploration and questioning and leads to investigation into a worthy question, problem or idea. It involves asking questions, gathering and analysing information, generating solutions, making decisions, justifying conclusions, and taking action (Galileo Education Network, 1999 – 2011). By using this model the resource applies the *thinking* key competency, drawing on intellectual curiosity by relating issues happening in Antarctica back to similar issues happening in the students' own countries. This is through purposeful activities that relate to the Maori perspective and form relationships between the Antarctic Treaty and the Treaty of Waitangi. The resource suggests students learn Te Reo associated with sustainability and create an Antarctic myth or legend, drawing inspiration from Maori mythology. The Treaty of Waitangi and cultural diversity are acknowledged as part of the *Guidelines for*

*Environmental Education in New Zealand Schools* (1999) key concepts and are recognised in the principles of the *New Zealand Curriculum* (2007). “Maori views of the world are also embodied in these concepts. Environmental education provides a context for learning about partnerships established by the Treaty of Waitangi for managing New Zealand... and passing on the significance of this heritage to present and future generations” (Ministry of Education, 1999, p.11).

*Care for our Coast Antarctica* (2008) is the only resource to relate to the health and physical education learning area of the *New Zealand Curriculum* (2007). The resource provides an activity from Antarctica’s protection component, where students create an orienteering course based on Antarctica’s specially protected, managed and historic areas. “Students learn about their own well-being, and that of others and society, in health-related and movement contexts” (Ministry of Education, 2007, p.17).

Information Communication Technology (ICT) has a major impact on the world in which young people live. E-Learning assists the making of connections by enabling students to enter and explore new learning environments, overcoming barriers of distance and time (Ministry of Education 2007). *Care for our Coast Antarctica* (2008) caters for 21<sup>st</sup> century learning and uses ICT to enhance research by providing interactive sites and a list of DVD resources that are fun and informative. These are incorporated throughout the resource in various activities, providing simplicity and ease for busy teachers.

The area where *Care for our Coast Antarctica* (2008) excels is in leadership. This is associated with the *managing self* key competency. Managing self is about self motivation, a ‘can-do’ attitude and where students see themselves as capable learners. It is the competency that develops leadership, where students establish personal goals and set high standards (Ministry of Education, 2007). The resource encourages students to take environmental leadership and build their awareness of Antarctica. It initiates students’ ability to take local action to safeguard the future of Antarctica (Gill, 2008). The resource develops students’ self-assessment skills by asking them to reflect on their learning in a learning log. The learning log requires them to draw conclusions from the activities they have been involved in and identify elements of Antarctica that promote leadership and awareness. “Students write in their learning logs about the qualities a team would need for an exploration trip to Antarctica” (Gills, 2008, p.4).

*Care for our Coast Antarctica* (2008) resource has a leadership in action section to the themed components and provides ideas and activities for students to explore on a local level, which can reduce their impact on the earth. For the climate change component, the leadership in action area suggests making a class pledge to cut their energy consumption and plant trees. The resource also provides a website that can help guide this process (Gill, 2008). The leadership in action section becomes the driving force once exploration around Antarctica is complete. The section challenges students to take action by identifying an environmental issue happening locally and, with their new knowledge, they can involve their community along the way. The student initiated action applies itself to the managing self key competency by drawing on areas of enterprise, resourcefulness, reliability and resilience (Ministry of Education, 2007).

*Care for our Coast Antarctica* (2008) also suggests a red sock day to acknowledge and celebrate the learning and action students have taken. It shares the story of the importance of red socks in New Zealand's history and how they are a symbol for leadership. This celebration relates to the *participating and contributing* key competency by being actively involved in communities.

Communities include family, whanau, and school and those based, for example, on a common interest or culture. They may be drawn together for purposes such as learning, work, celebration, or recreation. Students who participate and contribute in communities have a sense of belonging and the confidence to participate within new contexts. (Ministry of Education, 2007, p.13)

Haywood, E. (2002). *Classroom Antarctica*. Australian Antarctic Division.  
Retrieved from <http://www.classroom.antarctica.gov.au/>

*Classroom Antarctica* (2002) is an Australian resource aimed at students living in Australia. The focus is to stimulate students' interest in real-world applications for science, mathematics and the studies of society and environment. The resource recognises Antarctica as an inspiring setting to engage students in learning. (Hayward, 2002)

The *Classroom Antarctica* (2002) resource separates aspects of Antarctica into eight components, which encourage students to think critically about the key issues currently facing Antarctica. These include climate change, tourism, whaling, fishing, mineral exploitation, resource management and the impact of humans on the environment (Hayward, 2002). The resource uses a variety of kinaesthetic, auditory and visual aids to cater for a variety of learning styles. This relates to the *thinking* key competency by "using creative, critical and meta-cognitive processes to make sense of information, experiences, and ideas. These processes can be applied to purposes such as developing understanding, making decisions, shaping action, or constructing knowledge" (Ministry of Education, 2007, p.12).

*Classroom Antarctica* (2002) makes reference to the arts learning area in its continent component of the resource. It identifies the notion of myths around the world, making connections to the northern polar-regions and Aboriginal dreamtime creation stories. It makes suggestions for students to write their own myth about Antarctica. Students are encouraged to explore the visual art and music disciplines through ideas around colour and sound and use different mediums to create sculptures of Antarctica. *Classroom Antarctica* (2002) draws on the Antarctic Art's Fellowship programme and incorporates the ideas and examples of the artist's work in the resource.

Information Communication Technology (ICT) is recognised in the *using language, symbols and text* key competency. "Students who are competent users of language, symbols and text can interpret and use words, number, images, movement, metaphor and technologies in a range of contexts. They use ICT to access and provide information and to communicate with others" (Ministry of Education, 2007, p.12). *Classroom Antarctica* (2002) is an online resource, however the Australian Antarctic Division will provide resource kits to teachers



living in Australia. It directs students to websites where reliable information can be accessed about the Antarctic components they are studying. The information comes from websites that are associated with the Australian Antarctic Division drawing on the ideas of an Antarctic community network.

The living component of the *Classroom Antarctica* (2002) resource introduces students to the people who live and work in Antarctica, and explores the personal and professional qualities they need to have, the effects of isolation and the constraints of their temporary home (Hayward, 2002). This relates to the key competencies *managing self and relating to others*. It also draws on the ideas of leadership.

Students who relate well to others are open to new learning and able to take on different roles in different situations. They are aware of how their words and actions affect others. They know when it is appropriate to compete and when it is appropriate to co-operate. (Ministry of Education, 2007, p.12)

The living component provides realistic activities where students have to apply problem-solving techniques. It explores the nature of community, and the qualities people need to live in harmony. It provides a way of exploring human dynamics and gender equity issues, and learning conflict resolution skills. One of these activities has students living and working together in a tent for the day. As a class, they then discuss some of the interpersonal issues that arose, and ways of resolving any conflicts that occurred (Hayward, 2002).

Loves, J., & Champion, J. (1998). *Discovering Antarctica. A Resource Book for Teachers*. South Yarra, Australia: MacMillian Education Australia PTY LTD.

*Discovering Antarctica* (1998) is an Australian with a focus on providing valuable knowledge and understanding about the Antarctic environment and the world we live in. The resource is designed to accompany four books called; The Land, People, Plants and Animals and The Future.

*Discovering Antarctica* (1998) is a resource with a simple layout. It is structured with activities to follow the themes of the four books. Most of the activities are designed to be photo-copied for students to work from. Three activities provide reflection and discussion from students, related to issues happening in the Antarctic. These are: 1. Antarctic decision making – where students rate the problems faced by explorers in order to survive Antarctica. 2. To mine or not to mine? – Students debate whether mining should happen in the future. 3. A Survey: Antarctica – A World Park? – Students create a survey asking for a community response to the question.

The activities are fun and engaging, however only a limited understanding of Antarctica is developed from the resource. There are activities in the resource that could be seen as time fillers for teachers and do not reflect the *New Zealand Curriculum* (2007) vision for young people. This is displayed in an activity where students make a whale and measure it. The intended outcome is a wall display.

*Discovering Antarctica* (1998) provides the first step of inquiry learning, building knowledge, but fails to follow through with empowering students by developing self initiated action.

Inquiry is a study into a worthy question, issue, problem or idea. It is the authentic, real work that someone in the community might tackle. It is the type of work that those working in the disciplines actually undertake to create or build knowledge. Therefore, inquiry involves serious engagement and investigation and the active creation and testing of new knowledge” (Galileo Educational Network. 1999-2011).

Naumann, R. (2007). *The Big Resource Book of Antarctica*. Hong Kong, China. Nelson Price Milburn Ltd.

The *Big Resource Book of Antarctica* (2007) is for Australian and New Zealand schools. It covers all strand areas by focusing on; culture and how it functions, the relationship between people, places and environments, how past events, experiences and actions help us understand the past and present and help us imagine possible futures and the ways people take part in economic activities (Naumann, 2007).

*The Big Resource Book of Antarctica* (2007) focuses on acquiring knowledge, as well as developing and consolidating a variety of skills. The resource is set out in a series of units, providing information and a list of questions for students to answer in each unit. The resource asserts that “it practises all the processes of social enquiry” (Naumann, 2007, p.65) To confirm this statement, the resource questions were compared to *Bloom’s Taxonomy* (Ministry of Education, 2010). Different types of questions can be found in each category, however the majority of questions are found in the areas of knowledge, comprehension and application, which tend to be considered the lower end of the taxonomy.

<p style="text-align: center;"><b>Bloom's Taxonomy</b></p> <p style="text-align: center;">THEORY → PRACTICE</p>			
Level	Behaviours	Activities	Products
Knowledge	Requires no transformation of information and may be referred to as rote recall	Locate, match, identify, listen, observe	Tapes, diagrams, models
Comprehension	Low level of understanding, making use of information and enabling student to restate ideas	Research, ask, discover	Books, magazines, videos, newspapers
Application	Using previously learned ideas, procedures or theories in a new context	List, construct, teach, paint, report, sketch, experiment, manipulate, interview, stimulate	Diary, puzzle, map, diorama, scrapbook, collection, sculpture, model, illustration
Analysis	Breaking down a whole into its elements or parts	Classify, categorise, separate, compare, contrast, advertise, survey, dissect	Graph, questionnaire, chart, commercial, diagram, report

Synthesis	Putting together parts to form a whole	Combine, invent, compose, hypothesise, role-play, create, write, imagine, infer	Cartoon, poem, story, play, song, pantomime, recipe, invention, article, video, web page
Evaluation	Making judgments or placing values upon something for a given purpose	Judge, evaluate, discuss, debate, decide, recommend, choose	Self-evaluation, group discussion, mock court trial, conclusion, review

Figure 2: Bloom's Taxonomy

*The Big Resource Book of Antarctica* (2007) links to all learning areas of the curriculum with a large focus on English literacy, which is stated in the resource objectives. This relates to the *using language, symbols and text* key competency. "Using language, symbols and texts is about working with and make meaning of the codes in which knowledge is expressed" (Ministry of Education, 2007, p.12).

*The Big Resource Book of Antarctica* (2007) makes reference to using Information Communication Technology (ICT) providing suggestions for students to explore information further on the internet; however no support is provided for students or teachers to achieve this.

*The Big Resource Book of Antarctica* (2007) does not provide a sense of purpose for acquiring the Antarctic knowledge and lacks the ability to achieve empowering experiences for students to apply the knowledge. There is the possibly that students will become disengaged and off-task with the resource leading to behaviour management issues for teachers.

## Conclusion

The review gives a small insight into the variety of material available on Antarctica. The review critically analyses some resources which are highly effective tools that reflect the vision of the *New Zealand Curriculum* (2007) and see young people as our future leaders. The activities the resources provide prepare students for the 21<sup>st</sup> century and explore future focus issues, such as sustainability, citizenship, enterprise and globalisation, in relation to Antarctica (Ministry of Education, 2007).

At the other end of the spectrum there are resources based on an industrialised teaching and learning model which treats students as empty vessels who require filling with knowledge. These resources could potentially disengage students from the Antarctic topic.

In light of this information, Antarctic resources are only as good as the teacher using them. It is up to the resourcefulness of the teacher to create dynamic, informative lessons that provide for a variety of different learning styles. A teacher can create a successful inquiry learning unit, using knowledge based Antarctic resources. However the concern is that Antarctic resources are not readily available to teachers. There is a great deal of Antarctic material on the internet and at university libraries, but teacher have to spend valuable time researching to access it. Better promotion through teacher search engines and websites is advised. These include Knowledgenet, Te Kete Ipurangi and the National Library of New Zealand.

Antarctica provides a platform for teachers to make relevant connections to what is happening to the world around us. There is a variety of Antarctic material for teachers to engage students, but the teacher must be engaged first to achieve this. The next step for the author is to investigate the types of Antarctic programmes and opportunities available for teachers to participate in these programmes. Further study can look at the teachers who have participated in the Antarctic programmes and the level of education and outreach which has been achieved from the experiences.

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